Space Weather Forecast

Issued on Friday, 12 July 2024 at 13:12 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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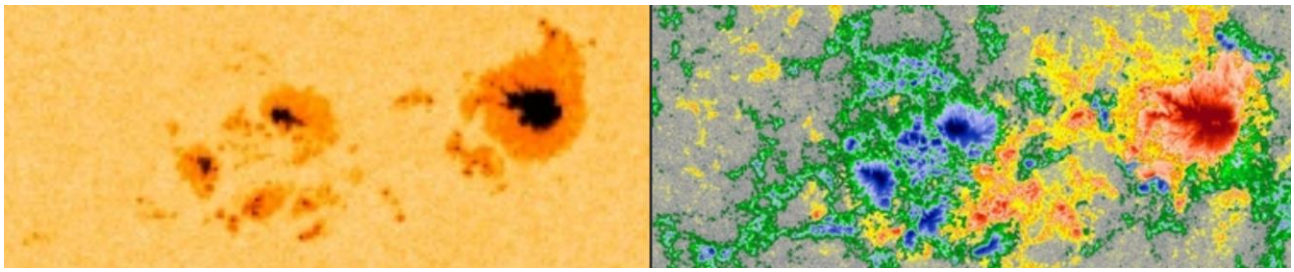
Space Weather Forecast Headline: Minor radio blackouts (R1s) likely. Peak chance of minor geomagnetic storm G1 over UTC weekend days.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity fell to Low, with frequent small Common-class flares mainly emanating from the largest central sunspot group. This was one of up to nine regions, with two newly-developing regions appearing in the northeast as a third faded in the southwest. The aforementioned largest sunspot region has seen slight proliferation of spots and penumbral growth in the trailing portion of this group.

Figure 1: Visible and magentic imagery of the largest sunspot on the facing side of the Sun from 12/1130UTC. There are now some signs of the main penumbra (large orange circular region surrounding the inner black umbra) becoming more symmetric, which tends to favour fewer large flares.



No Earth-directed Coronal Mass Ejections (CMEs) were noted in the period, with the main events in satellite imagery being CMEs from narrowly behind the western solar horizon around the turn of the UTC day 11 into 12 July, and also a 'prominence eruption' (arc of plasma) from the southeast around 12/0500UTC. Neither is expected to alter the forecast.

Solar Wind / Geomagnetic Activity: Slow solar wind conditions were observed. The solar wind speed fell very slightly within its typical background range, while the number of particles comprising the wind and their associated magnetic field were both unremarkable. The net result of the above solar wind measures was provisionally quiet geomagnetic indices throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate-class flares remain Likely, with the large central sunspot region the most probable source. No significant regions are due to depart or arrive in the period - keeping this risk flat throughout.

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Solar Wind /Geomagnetic Activity: No Earth-directed CMEs currently feature in the forecast. Initial slow wind conditions may give way to a chance of slight enhancement from any fast wind interaction within the remainder of the current UTC day of 12 July. A more notable enhancement is then likely over the UTC weekend due to the onset of the fast winds from a more strongly defined 'coronal hole'. By the new working week the solar wind is expected to decline to Background levels.

Initially quiet geomagnetic conditions may increase, with a chance of G1/Minor geomagnetic storm peaking over the UTC weekend days, before reverting to quiet to Unsettled conditions into the new UTC working week.

Energetic Particles / Solar Radiation: High energy proton flux carries a daily Slight Chance of rising to exceed S1 in response to any notable flares from AR3738. This risk increases very slightly as this region progresses westwards in the period, with other regions contributing relatively little.

High energy electron flux is expected to remain mostly at Normal Background levels, but may respond to any fast wind enhancement, increasing to Moderate or perhaps High on days 3 and 4 (14 and 15 July). The associated 24-hour fluence is expected to remain below the Active level, but with a slightly increasing trend later in the period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	50	50	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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